claims is respectfully requested in view of the above amendments and the following remarks.

A. 35 U.S.C. §112, First Paragraph: Rejection of Claims 6, 11 & 21

The Examiner rejects claims 6, 11 and 21 under 35 U.S.C. §112, first paragraph. Applicants amend such claims to address the concerns raised by the Examiner and to conform the claim language of each respective claim to the structure shown, for example, in Figure 6 of the application. Applicants respectfully request the Examiner withdraw the rejection under 35 U.S.C. §112, first paragraph.

B. 35 U.S.C. §102(e): Rejection of Claims 1 & 2

The Examiner rejects claims 1 and 2 under 35 U.S.C. §102(e) as anticipated by U.S. Patent No. 5,736,192 issued to Okamoto (Okamoto). The Examiner points to Figure 13F and alloy layer 26 of Al-Cu-Ti in which the alloy contains one percent by weight copper and one percent by weight titanium.

Claims 1 and 2 are canceled rendering the rejection under 35 U.S.C. §102(e) in view of Okamoto moot.

C. 35 U.S.C. §102(b): Rejection of Claims 1 & 2

The Examiner rejects claims 1 and 2 under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,665,643 issued to Shin (Shin). The Examiner points to the multi-layered interconnection structure shown in Figure 2 from alloy layer 22c of Al-Cu-Ti. Claims 1 and

2 are canceled rendering the rejection under 35 U.S.C. §102(b) moot.

D. 35 U.S.C. §103(a): Rejection of Claims 1-21

The Examiner rejects claims 1-21 under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 5,635,763 issued to Inoue et al. (Inoue) in view of U.S. Patent No. 5,641,992 issued to Lee et al. (Lee).

Inoue describes a multi-layered interconnection structure focusing on electromigration performance and stress migration performance. In one example, (Figure 3A) Inoue describes a multi-layer array structure of Ti-TiN-Al alloy-Ti-TiN. Examples for the aluminum alloy include, Al-Cu, Al-Si, and Al-Ti.

Lee describes various aluminum alloys and studies the electromigration of each alloy. One alloy studied by Lee is an Al-Cu-Ti alloy of 0.5 percent copper and 0.15 percent titanium. The electromigration study of this alloy and other alloys conclude that the Al-Cu-Ti at the percentage given (weight percent?) offers the worst electromigration performance, with straight Al-Cu alloys offering much better performance. Thus, the combination of Inoue and Lee suggest combining an Al-Cu alloy in the multi-layered structure of Inoue.

In the application at pages 11-12 and Figure 7, an evaluation of various aluminum alloys is illustrated. Figure 7 is a graph that shows the electromigration lifetime for each of the alloys studied. As illustrated in Figure 7, the most striking result was the electromigration lifetime of the Al-Cu-Ti alloy. As

illustrated by Table 1 (page 11) and Figure 7, the electromigration lifetime of the Al-Cu-Ti alloy was multiplicative rather than additive as one of skill in the art might expect given the known properties of Al-Ti and Al-Cu alloys.

Independent claim 4 is prima facie not obvious over the cited references, because the cited references do not describe an Al-Cu-Ti alloy containing about 0.1 percent Ti. Instead, Lee describes 0.15 percent Ti and it is unclear whether this is an atomic or weight percentage. The motivation to modify the amount of titanium cannot be found in Lee as Lee suggests that alloys without Ti produce better electromigration results. Claims 5 and 6 depend from claim 4 and therefore contain all the limitations of that claim. For the reasons stated with respect to claim 4, claims 5 and 6 are not obvious over the cited references.

Independent claim 9 is similar to independent claim 4 is that it describes an interconnection of Al-Cu-Ti alloy with about 0.1 atomic percent Ti. Accordingly, for the reasons stated with respect to independent claim 4, independent claim 9 is not obvious over the cited references. Claims 10 and 11 depend from claim 9 and therefore contain all the limitations of that claim. For the reasons stated with respect to claim 9, claims 10 and 11 are not obvious over the cited references.

Independent claim 14 relates to an integrated circuit comprising a substrate and an interconnection level. The interconnection level comprises an Al-Cu-Ti alloy layer containing 0.1 atomic percent Ti. In this regard, the arguments presented above with respect to independent claims 4-6 may be used to

distinguish independent claims 14 and 15 from the cited references.

Independent claim 16 relates to a multi-layered interconnection structure formed on a substrate. A portion of that interconnection layer comprises an Al-Cu-Ti alloy layer containing about 0.1 atomic percent Ti. Thus, the arguments distinguishing claims 4-6 may be used to distinguish claims 16 and 19-21.

For the reasons stated above, Applicants respectfully request the Examiner withdraw the rejection to remaining claims 4-6, 9-11, 14-16 and 21 under 35 U.S.C. §103(a).

CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

Respectfully submitted,

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Dated: 1/25/00

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CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on January 25, 2000.

Nedy Calderon 1/25/00

Nedy Calderon Date